

In the Claims:

The listing of claims will replace all prior versions and listings of claims in the application.

Claim 1. (Original) A polishing apparatus which presses together and makes move relative to each other an object to be polished held at a polishing head and a polishing pad in a state where a polishing agent is interposed between a polishing surface of the object and the polishing pad so as to flatten the polishing surface of the object by chemical mechanical polishing,

the polishing head comprising:

a polishing agent receiving unit for receiving the polishing agent,

a holding means for holding the object to be polished in a holding recess in the polishing head,

a contact portion which is positioned at the periphery of the holding recess and is fully contacted to the polishing pad to define a closed space for positioning the polishing agent between the polishing surface of the object to be polished and the polishing pad,

a polishing agent feed control means for controlling the feed of the polishing agent from the polishing agent receiving port into the closed space in response to the amount of the polishing agent in the closed space.

Claim 2. (Original) A polishing apparatus as set forth in claim 1, wherein:

the polishing agent feed control means comprises a feed port for feeding the polishing agent from the polishing agent receiving portion into the closed space, and a valve means provided with a valve for opening and closing the feed port.

Claim 3. (Original) A polishing apparatus as set forth in claim 1, wherein:

the holding means has in a holding recess of the polishing head a holding diaphragm which is provided so as to form with the holding recess a feed space to which a predetermined fluid is supplied, which is formed by a diaphragm which is deformed by a

pressure of the fluid, and which is provided with a facing surface portion facing a back surface of the polishing surface of the object to be polished and a fitting surface portion integrally formed with the facing surface portion and fitting with the outer circumference of the object to be polished and

the fitting surface portion of the holding diaphragm wafer presses the outer circumference of the object to be polished by the pressure of the fluid fed to the feed space to hold the object to be polished.

Claim 4. (Original) A polishing apparatus as set forth in claim 3, wherein the facing surface portion of the holding diaphragm presses the back surface of the polishing surface of the object to be polished held by the fitting surface portion against the polishing pad by the pressure of the fluid fed to the feed space.

Claim 5. (Original) A polishing apparatus as set forth in claim 4, wherein the fluid comprises the polishing agent.

Claim 6. (Original) A polishing apparatus as set forth in claim 2, further comprising a vibration imparting means for imparting vibration to the polishing agent.

Claim 7. (Original) A polishing apparatus as set forth in claim 6, wherein the vibration imparting means comprises an ultrasonic oscillator built into a polishing pad holding member holding the polishing pad and

ultrasonic vibration is imparted to the polishing agent held between the polishing pad and the polishing surface of the object.

Claim 8. (Original) A polishing apparatus as set forth in claim 7, wherein the ultrasonic oscillator built into the polishing pad holding member is arranged corresponding to a predetermined region of movement of the object on the polishing head.

Claim 9. (Original) A polishing apparatus as set forth in claim 6, wherein the vibration imparting means is provided at a polishing agent feed tank for feeding the polishing agent.

Claim 10. (Original) A polishing apparatus as set forth in claim 1, wherein the polishing agent contains a mixture of potassium hydroxide and silicon dioxide.

Claim 11. (Original) A polishing apparatus as set forth in claim 6, wherein said polishing apparatus further comprises a feed pipe for continuously feeding pure water on to the polishing pad,

the vibration imparting means is provided at the feed pipe, and

the vibration is propagated to the polishing agent on the polishing pad by the pure water fed on to the polishing pad.

Claim 12. (Original) A polishing apparatus as set forth in claim 11, wherein the polishing pad is driven to rotate about a predetermined shaft,

the polishing head is driven to rotate at a position offset from the center of the polishing pad, and

the pure water feed pipe feeds pure water to the proximity of the center of the polishing pad.

Claim 13. (Original) A polishing apparatus which presses together and moves relative to each other a polishing head and a polishing pad in a state where a polishing agent is interposed between a polishing surface of an object to be polished held by the polishing head and the polishing pad so as to flatten the polishing surface of the object by chemical mechanical polishing, said polishing apparatus comprising a vibration imparting means for imparting vibration to the polishing agent.

Claim 14. (Original) A polishing apparatus as set forth in claim 13, wherein
the vibration imparting means comprises an ultrasonic oscillator built into a
polishing pad holding member holding the polishing pad and
ultrasonic vibration is imparted to the polishing agent held between the polishing
pad and the polishing surface of the object.

Claim 15. (Original) A polishing apparatus as set forth in claim 13, wherein the ultrasonic
oscillator built into the polishing pad holding member is arranged corresponding to a
predetermined region of movement of the object to be polished on the polishing head.

Claim 16. (Original) A polishing apparatus as set forth in claim 13, wherein the vibration
imparting means is provided at a polishing agent feed tank for feeding the polishing
agent.

Claim 17. (Original) A polishing apparatus as set forth in claim 13, wherein
said polishing apparatus further comprises a feed pipe for continuously feeding
pure water on to the polishing pad,
the vibration imparting means is provided at the feed pipe, and
the vibration is propagated to the polishing agent on the polishing pad by the pure
water fed on to the polishing pad.

Claim 18. (Original) A polishing apparatus as set forth in claim 17, wherein
the polishing pad is driven to rotate about a predetermined shaft,
the polishing head is driven to rotate at a position offset from the center of the
polishing pad, and
the pure water feed pipe feeds pure water to the proximity of the center of the
polishing pad.

Claim 19. (Original) A polishing apparatus as set forth in claim 1, wherein the object to be polished is a semiconductor substrate.

Claims 20-33 (Canceled)